The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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"This England"

IF, only a year ago, it had been suggested that by now Hitler would be in possession of the greater part of Europe, that we should stand alone, that arrangements for the invasion of Britain would proceed "according to plan," and that we should then accept the situation, if not with equanimity, at least without any sign of fear or apprehension, we should have been pardoned if we had ventured to doubt what is now the established fact.

Looking back on this wonderful year and endeavouring, as is always difficult, to reconstruct our frame of mind at the beginning of it, some justification for our suggested doubts could be found in our ignorance of the Hitler methods. The mind of decent man had not by then been called upon to contemplate or understand Fifth Columns and the arts of Quisling. The marvels of machinery might perhaps have got Hitler along part of the road, but without these new descents into infamy he could never have arrived at his present position. Nor, perhaps, can the Hitler mind even now grasp the reason for the total absence of fear and apprehension which has halted him and will finally destroy him. We have dealt with what little we had in the way of Fifth Columnists, and it is not for Hitler to know that Quisling is a disease from which the British-born are immune.

These facts would seem to justify a moderate indulgence in the contemplation of the glories of "This England," and in the consideration of our position and our duty when this miserable job is finished. From a business point of view it is clear that while we shall be half ruined, the rest of Europe will be hopelessly bankrupt and we shall be back in our old position of undisputed leadership. It should also be clear that our superior position is the direct result of centuries of unchallenged private enterprise, the system under which Governments rely upon the citizen and not the citizen upon the Government. Every country, even the most completely ruined, has its bureaucracy, and one bureaucracy is as good as another. Character, quality, grit, honesty, enterprise are all outside the forms and formulæ of the official method, and it is precisely on these peculiarly British attributes that the future well-being of mankind depends. There is little hope of the repair of the ravages of war if our Overseas Trade Department is to continue to exchange notes with its opposite number in Bulgaria, Uruguay, or wherever it may be, to the exclusion of, or over the heads of, our merchant houses. That would be to put ourselves on a level with the lesser qualities of the foreigner and though it is not our habit to say so, it is our higher qualities which alone can tackle the enormous tasks ahead. The necessity for such blunt speaking is the greater from the circumstance that for war purposes we have deliberately employed eminent socialists and allowed them to occupy some of the most important economic positions in the Government. War and peace being exact opposites, there is no objection to a frank recognition of the close affinity between socialism and a war economy, but it does not follow from that that the ideas of these same socialists will be helpful in the winning of the peace.

Napoleon's end was made more bitter by the contemplation of his defeat at the hands of "a nation of shopkeepers," and a full century of successful shopkeeping, since then, has provided the sinews which, despite bureaucratic handicaps, are now accomplishing the defeat of Hitler. We have ahead of us another full century in which, if the job is left to British "shopkeepers," prosperity and comfort can be restored to a war-weary world. It will not be easy, it will not be quick, and is quite unlikely to bring satisfaction to all at once, but there is no other method. There is now less doubt than ever of our ability to beat Hitler, but there is still more doubt than there ought to be of our ability to prevent the setting up here of a trading system framed on the Moscow model. Such a calamity, apart from the ruin it would bring to us, would amount to the resignation of the historic rôle and the heaven-sent duties of "This England."

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NOTES AND COMMENTS

War Supplies from the East

IT is heartening to learn that in addition to the steady and welcome influx of supplies from the Western hemisphere, a great part of the untold riches of Asia, Africa, and Australasia is now being systematically organised for the victory of civilisation. The Simla correspondent of *The Times* writes that proposals for intensifying the effort to supply war materials by members of the British Commonwealth of Nations in the Eastern Hemisphere are being examined, before the arrival next month of the mission led by Sir Alexander Roger and the Eastern Group Conference, which will include delegations from Australia, New Zealand, South Africa, Southern Rhodesia, Burma, Hong-Kong, Ceylon, Malaya, and the territories covered by the East African Governors' Conference, in addition to India. All the countries invited have agreed to the conference and are sending representatives, and there are signs that far-reaching policies will be devised for the purpose of marshalling the Empire resources behind the British effort and thus furthering the prosecution of the war. It is hoped that a policy will be evolved which will make the countries of the Eastern hemisphere as far as possible self-supporting for the purposes of war supplies, the deficiencies of one being made good from the resources of the others. Surplus production will be available for the general war effort of the British Commonwealth as a whole.

Canadian Official Support for Research

EARLY this week the Canadian Government announced the appointment of a committee of nine to administer the funds presented by patriotic citizens for assisting important technical projects and scientific investigations now being undertaken or proposed by the National Research Council with the object of increasing the efficiency of the Canadian war effort. According to *The Times'* Ottawa correspondent, the chairman of the committee is Dean C. J. Mackenzie, acting president of the National Council, and the members include Sir Frederick Banting, Mr. J. S. Duncan, Deputy Minister for Air, Professor Maas, head of the Physics Department of McGill University, and Colonel Allen Magee, executive assistant to the Minister of National Defence. It is understood that the funds given or promised amount to nearly $1,000,000. The Government has further established a War Contracts Depreciation Board of three members, with Mr. Justice McTague, of Ontario, as chairman. Its instructions are to decide what contracts are classifiable as war contracts, to ascertain the capital expenditure involved in executing them, to determine that part of it which will have no reasonable post-war value, and to fix for this certain depreciation allowances for income-tax purposes.

U.S. Chemical Exports

UNITED STATES exports of chemicals and allied products during the first half of the current year were valued at $128,361,000, which was a 55 per cent. gain over the $82,825,000 in the corresponding months of 1939. Since the outbreak of hostilities in Europe foreign demand for practically all types of American chemical products has been keen and increasing steadily. In June of the current year exports of such products reached the value of $26,000,000—double the value of shipments in the corresponding month of last year and the highest recorded for many years. While some of the warring nations have been purchasing larger quantities of American chemicals, the total increase in exports of these products has been due very largely to heavier demands from areas remote from the war zones. Shipments to countries of Latin and North America have been especially heavy in recent months, and substantial quantities have been going forward to countries of Asia, Africa and Australasia. Exports of practically all types of American chemical products have increased considerably, but demand in the first half of the current year was especially keen for coal-tar dyes, medicinals, industrial chemicals, explosives, and miscellaneous other products of lesser importance.

Scottish Aluminium Deposits

IN a letter addressed to the *Glasgow Herald*, Mr. A. B. Robertson, of Glendevon, calls attention to the existence all over Scotland of deposits of low-grade aluminium ore, many of which, he claims, could be worked successfully and profitably if new and up-to-date processes were installed to treat the ore. It is a known fact that high-grade and low-grade aluminium ores require different methods of treatment, and Mr. Robertson states that all suggestions made to the Minister of Supply to instal low-grade extraction plants have been turned down or ignored. In Canada and the United States low-grade ores have been treated profitably, even though their metal content is lower than the Scottish deposits to which the letter refers. A good many questions have been asked in the House of Commons within recent months about aluminium supplies, their prices and their sources, and Mr. Robertson now inquires whether the reason for the failure to investigate new low-grade extraction processes is that they are being wrecked on the old rock, "vested interests" or whether it is "just the usual brand of Government boneheadedness," as he cavalierly describes it, that is allowing the opportunity to be let slip. At all events, his last paragraph merits official attention: "An exhaustive examination," he writes, "should be made at once of these low-grade extraction processes and the best chosen; at the same time boring and analysing of any approved ore deposit brought to the Mines Department's notice should be put in hand without delay.

EGYPTIAN SUPERPHOSPHATE

According to a report from the American commercial attaché in Cairo, production in Egypt of sulphuric acid and superphosphate is a virtual monopoly controlled by the Société Financière et Industrielle—affiliated to the Egyptian Salt and Soda Company—whose plant is situated at Kafr-el-Zayat, some 80 miles west of Cairo. Acid output in 1939 amounted to 12,000 metric tons, 60° Bé. This entire output was utilised locally in the production of superphosphate. Imports of acid in 1936 totalled 3392 metric tons; in 1937, 2650; and in 1938, 1860. In 1939, despite the increased domestic output, some 4000 tons were imported, owing mainly to forward purchases which importers made in anticipation of war-time shortages. The Society's output of superphosphate in 1939 amounted to 18,000 metric tons and the company is confident of being in a position within the next few years to raise its production to at least 30,000 metric tons per annum. Since the establishment of the firm in 1936, imports of superphosphate have fallen from 86,661 metric tons in 1936 to 40,357 in 1939.

PAINTS AND VARNISHES were imported into Canada in May to the total value of $524,495, as compared with $586,911 in May, 1939. Of the 1940 total, the United States contributed $331,621 and the United Kingdom $181,821. Lithopone, dry fillers and colours, carbon black, zinc oxide and ground and liquid colours were among the leading items.

LIGNITE DEVELOPMENT IN DEVON, II

A New British Source of Charcoal

from a Special Correspondent

TURNING now to British lignite, so far as can be ascertained little effort has been made to develop the Bovey Tracey deposit, although it is evident from its montan wax content of about 7½ per cent. that it is a material admirably adapted to chemical development. During the latter half of the 19th century montan wax was extracted in Thuringia exclusively from thin seams of pyropissite, a variety of lignite remarkably rich in montanic acid. This mineral was entirely exhausted by 1910 and the Germans had been compelled to concentrate their efforts to obtain this wax from mineral returning poorer yields each year. In 1914 lignite would never have been considered worth while treating for montan wax unless the quantity contained exceeded 10 to 12 per cent., but during the war lignites were actually treated containing less than 4 per cent. of montan wax and there are at least three "Montanwerke" which, a few years ago, were passing lignite through extraction plants and recovering even less than this. For these reasons the well-known German industrialist, Hugo Stinnes, examined the Bovey Tracey deposits and his staff of chemists and engineers were investigating the possibilities of extracting montan wax from this lignite when the 1914 war broke out and the staff was interned. In 1925 the Wilson Syndicate, Ltd., examined the material and reports were made upon it by Dr. Mollwo Perkins and other high authorities. A shaft was sunk into the beds of lignite 270 ft. below the surface and it was then found that the material at this depth was in every way suited for development. Dr. Perkins's analyses of two portions of the lignite are given in the accompanying table.

Analysis of Devon Lignites

	Dark portion	Light portion
Volatile matter, including water ...	54.24	60.94
Water	15.82	14.11
Analyses on Dry Basis:		
Volatile matter	45.64	54.52
Ash	10.39	2.93
Fixed carbon	43.97	42.55
Calorific value—B.Th.U. per lb. ...	9477	11,115
Nitrogen	0.64	0.31
Sulphur	2.01	1.24
Residue from retorting 40 per cent.		
Volatile matter ...	10.94	
Ash	9.32	
Fixed carbon ...	79.74	
Calorific value—		
B.Th.U. per lb. ...	12,989	
Sulphur	0.71	

Oil derived from Retorts: 15.75 gallons per ton of lignite distilled together with 59 gallons of water.

Distillation of water-free Oil.

	%
0—170° C. ...	7.3
170—230° C. ...	9.4
230—360° C. ...	43.8
Residue ...	39.5
	100.0

In view of the experience which the Germans possessed in dealing with lignite as a raw material of the chemical industry, a report was also obtained from that country, which demonstrated that the quality of the montan wax from No. 1 and No. 3 seams was as good as the best produced anywhere in Germany, while that from No. 2 seam was even better. The crude brown coal was dried at 90° C. and benzol was used for extraction under pressure, the crude product being distilled five times with superheated steam under vacuum. The solvent loss was 6¾ gallons per ton of wax extracted. The crude wax had a melting point of 82° C.

Dr. Perkins pointed out that since the price of fuel in Somerset and Devon is very high, the lignite residues could be briquetted with good prospects of developing a satisfactory fuel industry after extracting the montan wax. He put forward five possible processes as follows:—

(1) Extraction of the wax followed by briquetting of the residue.
(2) Extraction of the wax followed by carbonisation of the residue.
(3) Carbonisation of the lignite as mined for the recovery of the distillates and resulting charcoal.
(4) Briquetting the crude lignite as mined without binders.
(5) Extraction of the wax, followed by gasification of the residue for power-production purposes.

In general, Dr. Perkins favoured the first and second of these proposals.

This promising project unfortunately came to a head about the time when the world depression was at its height and the difficulty of obtaining sufficient capital caused its postponement and ultimately its abandonment. We understand that the National Carbonising Co., Ltd., through its associated concern, the London Carbonising Co., Ltd., and in collaboration with Mr. Wilson, of the Wilson Syndicate, Ltd., has now obtained a long-term lease of this property, and proposes to develop it for products particularly required by this country in time of war. The mining shaft is already sunk and needs only to be cleaned out and relined. The railway sidings and other necessary facilities are already in existence. The effect of the war on local industries has been to create much unemployment and the influx of a new industry will be of the utmost value to the district. A start has already been made with repairs to the mining shaft and it is proposed as the next step to erect a battery of Rexco retorts which will carbonise the product for the production of charcoal and motor fuel for traction gas-producer vehicles.

Home-Produced Charcoal

Carbonisation of the lignite will produce a charcoal of excellent quality. Because of the lack of hard wood in Great Britain, charcoal has in the past been mainly imported to the extent of 15,000 tons annually from Sweden and Germany, through Holland, the standard price to consumers for many years being 140s. per ton. It is a necessity for the chemical and iron and steel trades, and is used for many other purposes. Owing to war conditions there is at present an acute shortage, and charcoal of good quality fetches up to £15 a ton, when obtainable. A ton of saleable charcoal can be produced from about three tons of lignite, costing at the pithead not more than 5s. per ton or perhaps a little more if it is dried before carbonisation; the total carbonisation costs of this quantity will be a maximum of 20s., so that the total cost of production of charcoal at works will be well below 40s. per ton, rendering the country independent of foreign supplies and, by providing a source of supply at a far lower price than previously known, establishing a peace-time industry. There is so little charcoal produced in this country that a home source of the magnitude proposed would be extremely valuable.

The new demand for a motor fuel for the gas-producer vehicle offers an additional and expanding market for charcoal. Originally developed in France, and later in Germany, Belgium and Italy, to restrict the imports of petrol and render those countries self-sufficient in power for motor, rail and water transport, the fuel used by these vehicles has been mainly charcoal. Charcoal is an almost perfect motor fuel, but in this country it is not available. The only natural fuel

found for the purpose is the best quality of anthracite, of which there is a limited supply and which carries the great disadvantage of a lack of reactivity. Consequently, the new industry must rely on smokeless fuel obtained by carbonisation, of which commodity there is very little suitable, and none equal in efficiency to charcoal, with its great reactivity and low ash content. The present price to consumers of motor fuel derived from coal is 115s. per ton for small quantities and 90s. a ton for truck loads, the price realised at works averaging at least 70s. per ton. The conversion of our heavy motor transport from imported petrol or diesel oil to home-produced solid fuel is being gravely impeded by shortage of suitable fuel, and although there are comparatively few vehicles fitted for using solid fuel on the roads, there is already an acute shortage in the supply of the fuel. It is officially stated that there are under construction ten times the present number of gas-producer vehicles now on the roads.

When this part of the scheme is in satisfactory commercial operation, it is proposed to erect plant for the production and refining of montan wax and other by-products obtained by working-up the tar. There appears, therefore, to be every likelihood of developing a new branch of chemical industry, similar to the German brown coal industry, as a result of the present war. It must be recognised, however, that this is not simply a war venture; montan wax is valuable at all times. According to the Board of Trade's statistics, between January and July, 1939, Germany exported 3087 metric tons of montan wax of which 486 tons went to this country, 2099 tons to the U.S.A., 417 tons to Poland and 123 tons to Italy.

In addition to the analyses given previously, Dr. Perkins examined separately three seams from the Heathfield shaft and in each of these seams found the ash content to be between 3.1 per cent. and 3.4 per cent., equivalent to about 7 per cent. in the finished charcoal. For traction gas producers and for most purposes for which charcoal is used in the chemical industry, this ash content would have no significance. There are unquestionably many uses for which lignite char would be thoroughly well adapted; for certain other uses a definite opinion cannot be given until a large quantity of the char has been produced than has yet been found possible.

A CHEMIST'S BOOKSHELF

TECHNICAL METHODS OF CHEMICAL ANALYSIS, 2nd Ed., Vol. IV. Edited by Charles A. Keane and P. C. L. Thorne. London: Gurney and Jackson. Pp. 963. 84s.

The series of chemical text-books initiated by the late Dr. Lunge has for long had an honoured place on the shelves of industrial chemists, and the publication of this volume carries the revision of the first edition of Lunge and Keane's *Technical Methods of Chemical Analysis* (which must be now some 30 years old) one stage further.

A perusal of its pages reveals the great amount of standardisation that has been effected in analytical procedure since the first edition appeared. The labours of the British Standards Institution have been extended to cover a wide variety of processes and appliances with which the chemist is concerned, so that many of the standard methods referred to, particularly in the section dealing with coal gas, are to be found in British Standard Specifications. The analytical chemistry of the British tar trade is now largely covered by the publications of The Standardisation of Tar Products Committee to which extensive reference is made in this book. British Standard Specifications exist for the evaluation of calcium carbide, though not all the chemical methods required in the industry are contained in these specifications. Explosives, matches and fireworks, and the textile industry (with which this volume also deals) do not appear to have come under the notice of the British Standards Institution as yet.

In so far as this book covers the same field as the first edition, the general arrangement of the sections appears to have been retained, with the necessary additions to bring the work up-to-date. It may well be asked, however, why Fuel Analysis and Technical Gas Analysis should be placed in Vol. I while Coal Gas and Tar Products, which are intimately related to these subjects, are reserved for Vol. IV. Why should not all fuel and carbonisation subjects be gathered together in one volume? One might also ask why attention is not paid to such an important section as the coke-oven industry, in which the methods used are not necessarily the same as in the gas industry. Had this been done we have no doubt that the old, and now universally discarded, sand test for the coking power of coal would have been omitted in favour of the modern methods such as the Sheffield Coking Test, the Plastic Curve, and the Woodall-Duckham Test, the last being the subject of a British Standards Specification. The importance of benzol recovery leads to surprise that on page 38 there should be no more than a few lines descriptive of the recovery of benzol and the well-known methods for the estimation of benzol in gas, such as the active carbon method, should be omitted. It is surprising, too, that no detailed directions are given for the estimation of this important constituent. The sections dealing with Coal Gas and Coal Tar contain a great deal of valuable information in addition to technical methods of analysis, and give alternative methods of considerable value. Frequently methods are not given in detail, but references are given to a British Standard Specification or other source of information.

The Explosives section strikes us as being particularly detailed, but as containing so many alternative methods for some of the analyses that only the experienced explosives chemist can hope to find his way through the maze. That, of course, was a well-known criticism of all the books written by Prof. Lunge; they were so wide in scope that it was often impossible to determine what was industrial practice and what was theoretical suggestion or patent specification that had not gone beyond exposition on paper. The section on stability tests is an instance in point, in which 36 test methods are described. If the explosives industry is in this state of uncertainty in regard to its tests one might suggest that the sooner the British Standards Institution takes a hand the better. Even so, we do not see any reference to detonation tests by the falling weight method, a method that seems to be favoured in America. Prof. Reilly, who deals with the explosives section, also writes on Matches and Fireworks.

One-third of the book is devoted to Textile Chemistry, and here eight collaborators discuss analytical procedure as applied to general testing and microscopy, mechanical and chemical testing of textile materials, analysis of commercial dyestuffs, fastness tests, colorimetry and spectrophotometry, testing by fluorescence, textile auxiliaries, and the examination of textiles after finishing. It is one of the best features of this book that it is not a soulless list of analytical methods giving the bare bones of a procedure, but that it is full of readable explanations of the importance of certain properties and of the procedure adopted. It is in the best sense of the word a treatise on industrial analysis.

It is not possible to give a detailed criticism within the space available, but inevitably the chemist who is expert in whatever branch of industry is discussed will disagree with some of the methods suggested by the authors, will wish that more information had been given about other methods, and will feel that on some occasions the methods described might well have been omitted. Nevertheless, the value of the book is indeed considerable and it contains a symposium of industrial analytical practice which, taken in conjunction with the references to other sources, should enable the chemist to obtain detailed information on nearly every specialised analytical procedure in the industries covered.

Personal Notes

COUNCILLOR JOHN WILLIAMS, Mayor of Widnes, has been appointed J.P. for the County of Chester. Mr. Williams is well known in the chemical industry, and started his career with the United Alkali Co., serving later on at the Pilkington-Sullivan and Castner-Kellner works. In 1937 he was appointed delegate director of I.C.I. (General Chemicals), Ltd. He was due to retire from the board in 1939, but owing to the state of emergency is continuing in office for the duration of the war.

OBITUARY

MR. HARRY HADFIELD, of Furness Vale, who died recently, aged 78, had been a drysalter at Bollington, Cheshire, for 20 years. Previously he had worked in the office of Furness Vale Printworks, and later he became proprietor of a soap works at Bridgemont.

The death of SIR JOSEPH JOHN THOMSON, O.M., F.R.S., Master of Trinity College and Professor of Physics at Cambridge University, on August 30 at the age of 83, follows close upon that of Sir Oliver Lodge, so that the country has been robbed of two great scientists in as many weeks. "J.J." approached science from the mathematical side, but his greatest claim to fame was the major share in the discovery of the electron, which revolutionised the concepts of physics and chemistry. He was appointed Cavendish Professor of Experimental Physics in 1883, in succession to Rayleigh, was P.R.S. in 1915-20, and was a member of the advisory committee of the D.S.I.R. from its inception until 1927. He was a Nobel prizeman, a Copley medallist, and a Kelvin medallist, and was President of the British Association in 1909.

New Control Orders

Industrial Ammonia

THE Control of Industrial Ammonia (No. 1) Order, 1940, which has been made by the Minister of Supply to take effect from September 2, provides for the licensing by the Ministry of producers of any anhydrous ammonia and any ammonia liquor containing not less than 12 per cent. ammonia. No licence is required for the production of any such ammonia for the purpose of the manufacture of any nitrogenous fertiliser. Application for a licence should be made to the Ministry of Supply, Industrial Ammonia Control, 19 Berkeley Square, Bristol, 8.

FACTORY EXEMPTION OF AUTOCLAVES

H.M. Chief Inspector of Factories announces, by Certificate of Exemption No. 9 (General), that autoclaves are exempted until further notice from the requirements of Section 29, Sub-section 1 (*a*) (iv) of the Factories Act, 1937, provided that steam or water contained in any such boiler shall not be drawn off, nor be permitted to escape while the boiler is being heated, except such steam as may escape from a safety valve, fusible plug or bursting disc as the case may be; and provided that the use of any test cock or valve fitted at or above the normal water level for the purpose of ascertaining or adjusting the height of the water shall be deemed not to contravene this condition.

A NEW USE FOR STAINLESS STEEL has been found in New York City, where a colossal sculptured panel, symbolising "News," has been designed by the Japanese-American artist, Isamu Noguchi. The panel, 17 ft. by 22 ft., depicting the heads and torsos of five men, working with the tools of modern journalism, has been cast in stainless steel and erected over the main entrance of the Associated Press Building. It was cast in nine sections from the plaster mould, trimmed by precision tools, and welded into three portions, which were finally bolted together in position.

British Chemical Prices

Market Reports

A MODERATE market activity is in evidence in general chemicals and new bookings for home requirements appear to be well maintained. Dealers report a fair export inquiry and some improvement is noticeable in the availability of supplies for items such as cobalt, chrome products and metallic salts. Tartaric and citric acids and cream of tartar are in good request both for home and export with quotations for the last-named product dearer at 152s. per cwt. Elsewhere prices are steady with a firm undertone. Business in the coal tar products is reported fair and the market is without feature.

MANCHESTER.—Actual contract movements into consumption against contracts have been adversely affected to some extent by brief holiday stoppages in some centres in Lancashire, but otherwise it is reported on the Manchester chemical market that the call for supplies has been of fair extent, especially in the alkali products and the leading heavy acids, whilst inquiry on export account has continued on moderate lines. Actual price movements compared with a week ago have been few and small, though a generally firm undertone is reported. The light coal-tar products continue to be called for in fair quantities.

GLASGOW.—The war has now been in progress for a year, and in looking back over this period one is surprised to find how well the Scottish heavy chemical trade has kept on supplying the needs of industrialists in spite of the temporary shortages caused by the cessation of imports of certain chemicals from the occupied territories. Of course, this has been aided somewhat by Government control of those chemicals which have been reserved for the essential war industries. Demands have been met, in most cases, and business goes on as usual. We must not forget that America has helped us considerably, and is still doing so. This week orders have been steady, and prices show little change, though if anything, are a shade higher.

Price Changes

Cream of Tartar.—100%, £7 12s. per cwt., less 2½%, d/d in sellers' returnable casks; imported material would be dearer.

Oxalic Acid.—From £59 5s. per ton for ton lots, carriage paid, in 5 cwt. casks; smaller parcels would be dearer; deliveries slow.

Pyridine.—90/140°, 17s. 6d. per gal.; 90/160°, 15s.; 90/180°, 4s. to 5s. per gal., f.o.b. MANCHESTER: 18s. to 21s. 6d. per gal.

Tartaric Acid.—2s. 0½d. per lb., less 5%, carriage paid for lots of 5 cwt. and upwards. Makers' prices nominal; imported material 3s. to 3s. 3d. per lb., ex wharf. MANCHESTER: 2s. 3d. per lb.

Purchase Tax

Final Date for Registration

THE Finance Bill which has just become law empowers the Commissioners of Customs and Excise to prescribe the final date by which persons who are required by law to register for Purchase Tax purposes must do so. The Commissioners have made an Order requiring all persons now carrying on a registrable business to apply for registration before September 20, 1940.

Manufacturers of Purchase Tax goods and wholesale dealers in such goods who have not yet received a copy of the Customs explanatory leaflet and the necessary form of application for registration should obtain one, without delay, from their local Officer of Customs and Excise or from the Custom House, London, E.C.3. Registration under the Purchase Tax is entirely distinct from the Board of Trade registration in connection with the Limitation of Supplies Orders, though the two schemes have certain features in common.

The question has been asked why registration is necessary for Purchase Tax purposes. The first answer is that it is a legal obligation and heavy penalties are incurred by failing to do so before the above date. But there is more in it than this. A firm which is not registered is unable to buy Purchase Tax goods tax free for its business. On the other hand, a firm incurs no additional liability by registration since the obligation to pay tax on its *sales* of such goods to retailers exists under the law whether the firm is registered or not. The Order referred to above is S.R. & O., 1940, No. 1552, copies of which may be obtained from H.M. Stationery Office, or through any bookseller.

Iodine Shortage in Germany

Recovery Methods and Development of Substitutes

THE curtailment of imports by the Allied blockade has caused a considerable shortage of iodine in Germany and measures have been adopted for restricting consumption and maintaining supplies for indispensable requirements, according to an American consular report.

Germany is dependent upon foreign sources for all its iodine. In consequence of a special trade agreement with Chile, net imports expanded markedly in 1935 to 228,500 kg. from 57,600 in 1934. Later, however, imports contracted steadily, falling to 126,800 kg. in 1938 and 107,500 in the first seven months of 1939.

Residues, solutions and other iodine-containing industrial wastes of the pharmaceutical industry, plants producing inorganic or organic iodine-containing preparations, and especially the photographic chemical industry, are considered the best sources for recovering iodine. In the case of many waste and residue materials, recovery of up to 98 or 99 per cent. is possible by methods that have been developed. While such recovery might be uneconomic in peace time, costs are subordinated to the imperative need of stretching existing supplies. Iodine contained in industrial residues can be recovered by various methods, depending largely upon whether the iodine is available in the residue as iodine or in the form of compounds, and whether it is in a concentrated or diluted state. Materials containing iodine in the form of iodine can best be processed by acidulation with concentrated sulphuric acid, the iodine being obtained by oxidation with nitrous acid. This method, which is cheap and returns yields of 98 to 99.5 per cent., is used extensively. Containers which have held crude iodine or iodine salts are also subjected to careful cleaning to ensure the maximum recovery of available iodine.

Germany has reduced iodine consumption by restricting its use and developing substitutes. Tincture of iodine may now be sold by druggists only against non-renewable physician's prescription and then, unless expressly stipulated by the physician, only in more dilute form than prescribed by the German Pharmacopœia. A new antiseptic agent incorporating oxygen bromine compounds, a metal salt and weak acid thiocyanate solutions, recently developed in Germany, has been found a suitable substitute for tincture of iodine. This agent has been accepted as standard by the German Army, and has reduced Germany's dependence upon iodine for medicinal purposes to a considerable extent.

Gelation of Tung Oil

The Effect of Asphaltic Materials

ACCORDING to a recent study by M. Tatimori (*J. Soc. Chem. Ind., Japan,* May 1940, p. 136B) of the rate of gelling of tung oil when heated with bodies such as petroleum pitch, gilsonite and stearin pitch, small percentages of the added material accelerate gelation whereas the process is reversed when the proportion is increased above a certain limit. The point of reversal (or inversion, as the author calls the phenomenon) occurs at 10 per cent. in the case of gilsonite, tar pitch and petroleum, while stearin pitch produces inversion at the much higher level of 25 per cent. The following results were obtained with samples heated at 270° C.

	% added.	Time of gelation in seconds.
Gilsonite:	0	782
	5	752
	11	771
	25	792
	35	849
	55	1108
Stearin Pitch:		
	0	776
	5	618
	10	551
	25	545
	35	566
	54	771

CERULEIN DYE BATHS

Cerulein sulphonic acid can be prepared by treating gallein with a combined dehydrating and sulphonating agent (as described in Swiss P. 200,373). By subsequent reaction of this sulphonic acid with an acid salt of sulphurous acid, a derivative readily soluble in water is formed. This is a powder, yellow-green to green in colour, from which, with the aid of a chrome mordant, solutions giving clear green shades on silk can be prepared. It is also applicable to cotton printing. Twenty parts cerulein sulphonic acid are dissolved by gentle warming in a solution of 15 parts sodium bisulphite in 80 parts water. The solution may be used in this form for dyeing and printing work. Alternatively the yellow-green compound can be precipitated by addition of sodium chloride, filtered and dried. It does not subsequently require the addition of bisulphite when being made up into dye solutions (Swiss P. 207,080, of Durand and Huguenin A.G.).

Inventions in the Chemical Industry

Applications for Patents

Method for the preparation of co-polymers of styrene, and products thereof.—A. Abbey (Dow Chemical Co.). 5867.

Method for the preparation of polymers derived from styrene, and products thereof.—A. Abbey (Dow Chemical Co.). 5868.

Method of producing therapeutically active sulphanilic acid amides.—Aktiebolaget Astra Apotekarnes Kemiska Fabriker. (Sweden, April 17, '39.) 5712.

Concentrating latex in centrifugal separators.—Aktiebolaget Separator. (Sweden, April 3, '39.) 6010.

Manufacture of synthetic diatomite or kieselguhr.—H. V. Allen. 5741.

Resin emulsions.—American Cyanamid Co. (United States, April 29, '39.) 5836.

Regeneration of catalysts.—Anglo-Iranian Oil Co., Ltd., E. W. M. Fawcett, and J. N. Haresnape. 5943.

Production of cyclic hydrocarbons.—Anglo-Iranian Oil Co., Ltd., E. W. M. Fawcett, and H. M. E. Steiner. 5945.

Production of isoparaffins.—Anglo-Iranian Oil Co., Ltd., D. A. Howes and E. W. M. Fawcett. 5943.

Gas-producers for use on power-driven vehicles.—Arlington Motor Co., Ltd., and T. C. Orme. 5727.

Bonding of refractory material.—O. G. Bennett and L. B. Berger. (United States, April 18, '39.) 5745.

Production of liquid fuels from plant material.—E. Berl. 5926.

Preparations comprising the follicle-stimulating gonadotrophic hormone.—Y. M. L. Bezoari. 5713, 5714.

Hormone preparations.—Y. M. L. Bezoari. 5715.

Latex foam vulcaniser.—D. Bridge and Co., Ltd. (United States, July 29, '39.) 5762.

Synthetic resins, moulding powders, etc.—British Rubber Producers' Research Association and F. J. W. Popham. 5690.

Manufacture of ferric chloride.—D. Brundrit and Imperial Chemical Industries, Ltd. 5797.

Electrolytic manganese process.—Consolidated Mining and Smelting Co. of Canada, Ltd. (United States, April 3, '39.) 5905.

Manufacture of organic compounds.—H. Dreyfus. 5655, 5991.

Manufacture of azo dyestuffs.—E. I. du Pont de Nemours and Co. (United States, March 29, '39.) 5672.

Manufacture of thioindigoid dyestuffs.—E. I. du Pont de Nemours and Co., and A. J. Johnson. 5594.

Production of elementary sulphur.—H. T. Durant. 5702.

Urea-formaldehyde moulding powders.—J. Ferguson and Sons, Ltd., J. E. Ferguson and S. A. Ede. 6026.

Processes for the protection of metals and alloys.—J. Frasch. (France, April 7, '39.) 5765.

Coating of strong metals or alloys of high melting point with other metals or alloys.—Glacier Metal Co., Ltd., P. T. Holligan and J. Bate. 5599.

Filters.—G. H. S. Grene and Wild-Barfield Electric Furnaces, Ltd. 6031.

Method of welding or cutting metal by electric arc, oxy-acetylene, etc.—S. S. Guy. 5592.

Alkaline detergents.—Hall Laboratories, Inc. (United States, May 1, '39.) 6015, 6016.

Metallurgical Section

September 7, 1940

ZINC SHEET

Its Manufacture and Properties

by FREDERICK NEURATH, Ph.D.

ALTHOUGH brass, the alloy of zinc and copper, was known in ancient times, zinc as a single metal was dealt with much later and for the first time in China, and came to be known as "false silver" or "Chinese iron." The names "Zincum" and "Spelter" were first used by chemists in the middle ages and the metal which we know nowadays as zinc was first so called by Paracelsus. It was used long before Christ as an alloy with copper; Aristotle (384-322 B.C.) states in his writings that one can colour copper golden-yellow by adding a certain earth. But in Europe for more than 14 centuries there was very little progress in the knowledge of zinc, until about the end of the 18th century. Zinc, which previously had been imported from China, was then made in Europe by a metallurgical process. The first zinc sheet made in Europe was produced about 1808 in Belgium, where in the year 1812 the church in St. Bartholomew and the Cathedral of St. Paul in Liége were roofed with zinc sheets. The result of these experiments was so satisfactory that this kind of roofing became soon universal in Europe.

Zinc metal is produced from zinc-bearing ores either by a dry process through heat (muffle-process) or by a wet process by means of an electric current (electrolysis). The starting material for the first is zincblende (ZnS), a sulphur-containing ore with 48-60 per cent. zinc and about 30 per cent. sulphur. Secondary ingredients are lead, cadmium, iron, silicic acid, etc. The ore has to be roasted into zinc oxide and the sulphur-holding gases are used for the production of sulphuric acid. The zinc oxide is then reduced by mixing with fine gas-poor coal and heating in muffles (retorts). The resultant zinc vapour is converted into metallic zinc and zinc powder. The liquid zinc is cast into the usual plates and brought on to the market as "Original Raw and Refined Zinc"; the zinc powder is sieved and sold with a content of 92-93 per cent. metallic zinc.

Electrolysis.—Roasted (desulphurated) zinc ore is dissolved in dilute sulphuric acid. The lye is carefully cleaned from disturbing ingredients. In the electrolytic cell the zinc contained in the lye is deposited in metallic form on the aluminium cathode. The zinc sheets, stripped off the cathode, are then remelted into the usual plate form and sold as fine zinc or electro-zinc. This zinc, nearly chemically pure, is used in the zinc-sheet works in admixture with raw zinc.

Refining of Zinc

The original raw zinc has first to be refined in a process which consists in melting it in a reverberatory furnace whereby the lead and the iron-containing zinc (hard spelter) collects at the bottom and is separated. The refined zinc contains then only about 1 per cent. lead, 0.1 per cent. cadmium, 0.01 per cent. iron, which ingredients are not detrimental within these limits. The zinc thus refined is cast by means of calibrated ladles into rolling slabs, which are the starting product for the rolling process. The latter follows in two periods: the slabs are first stretched in one direction to a certain length and then rolled in the other direction. At the first stretching the plate is taken singly through the roll; then to complete the process, several sheets, the number depending upon their strength, are taken together in a packet through the cylinder. The finished sheets are marked with works- and number-stamps, examined for soundness and packed in wooden frames; for export they are packed in barrels lined with zinc sheet.

The technical data concerning zinc sheet are:—

Specific gravity 7.2

Expansion coefficient ... 1/340 of its volume at 100° C. (for Fe 1/900, for Cu 1/600).

The heat expansion is 1/3 more in the rolling direction than crosswise.

Brinell hardness 47

Melting point ... ... 420° C.

Tensile strength at 16° 19 kg/mm² lengthwise, 25° kg/mm² crosswise

Shear strength ... soft 12 kg/mm², hard 20 kg/mm²

Elongation c. 15 to 20 per cent. lengthwise and 10-15 crosswise

Bending strength less good parallel to the rolling fibre; cracks and breaks easier than when bent across the fibre.

Ductility: at 150°, greatest ductility (rolling temperature)
at 15°, minimum temperature for bending, folding, etc.
below 15°, brittle
above 150°, brittle and easily breakable
over 250°, pulverisable.

Zinc sheet to-day is entirely different in quality from that of former times on account of the technical and metallurgical progress in the working of raw zinc, attained by means of improved refining, alloying, casting and rolling processes, through the modern control of production in laboratory and testing plants, etc.

Advantages and Uses of Zinc Sheet

The most important uses for zinc sheet are for roofing and other building purposes: for drain-pipes, waste-pipes, window- and moulding-covering, wall-joints, wainscoting, ornaments, manufactured sheet-building materials, tringles and draught-proof joints on windows and doors, blinds for ventilators, insulations, etc., all applications encouraged by the ease of soldering. Zinc sheet is used everywhere to protect parts of buildings, etc., exposed to weather damage; but it should be emphasised that the physical characteristics must be considered, otherwise defects might occur for which the material could not be held responsible. Zinc sheet has great resistance to atmospheric influence, while galvanised iron sheets have the disadvantage that the zinc coating is thin and suffers not only during the working but also through the different expansion of iron and zinc, as well as through easy rusting and low corrosion-resistance. Although this last can be improved by protecting with paint or tar, the cost of maintenance is rather high. Zinc sheet needs no varnishing; within a few days of exposure to the air it covers itself with a layer of pale grey oxide, which turns after about three months to a basic zinc carbonate, protecting the sheet against atmospheric influence without lessening its durability. If there are no special atmospheric influences in the neighbourhood, *e.g.*, no chemical works, this durability lasts 35-40 years or even longer. Other advantages are that the value of the scrap sheet is still about 40 per cent. of its original

price, while scrap galvanised iron is practically worthless; and in consequence of the specific gravity it is possible to cover 28 m² with 100 kg. zinc sheet of ½ mm. thickness and only 26.2 m² with galvanised iron of the same strength. Zinc sheet is, therefore, lighter on the roof and so allows for a cheaper construction and a gentler slope, which makes it more economical. It is easily possible to cover every curve and inclination, such as corners, cupolas, and the like, but attention must be paid to the expansion of the sheets through change of temperature, and they should, therefore, be connected tightly with supports in one place only and they must be removable and only kept down with clamps. Only zinc nails or galvanised iron nails may be used, as copper corrosion would destroy the sheet, and gypsum and its mortar as well as contact with tannic acid and resins are to be avoided.

Corrosion-Resisting Alloys

Tests of Frictional Properties

IN order to establish the suitability for their use as machine bearings in the chemical industry, C. H. Meyer (*Archiv f. d. Eisenhüttenwesen*, 1940, *13*, 437-444), studied the frictional properties and the corrosion resistance of a great number of alloys, *viz.*, 32 different grey austenitic nickel cast irons, eight high-chromium cast irons and several commercial bearing metals. For the corrosion tests specimens were exposed for a maximum duration of 96 hours to the attack of the following corrosive agents in a variety of concentrations: hydrochloric sulphuric, sulphurous, phosphoric, and acetic acids, as well as sodium hydroxide and magnesium chloride.

The frictional properties were determined with the help of a complicated device permitting the measurement of the frictional forces occurring in the bearing. Grey austenitic nickel cast irons proved to have good frictional properties, provided that they did not contain too large graphite inclusions. Their frictional properties could be improved further by the use of hardened shafts and by small additions of antimony.

Copper for Resistance to H_2SO_4

Grey nickel cast irons were extremely resistant to alkalies, even at high temperatures. Their acid resistance was not so great, neither could it be improved to any important extent by increasing their chromium content. Additions of copper, however, increased the resistance to sulphuric acid, and additions of molybdenum and, in particular, of antimony, increased the resistance to hydrochloric acid. As material for bearings in the nitric acid industry only high-chromium alloys proved to be suitable. The frictional properties of carbide-ferritic chromium cast iron proved to be much superior to those of austenitic chromium-nickel cast steel. Austenitic-ferritic chromium-manganese cast steel, however, had rather good frictional properties. (*Bull. Iron and Steel Inst.*, 1940, *53*, 35A-36A.)

MAGNETIC ALLOYS

Cobalt has been used to increase the coercive strength and magnetic field strength of iron-nickel-aluminium alloys. This ingredient also results in some diminution of the residual induction. A product with magnetic properties superior to those of any known alloy is said to result from introduction of 12 per cent. cobalt into an alloy of iron containing 17 per cent. nickel, 11 per cent. aluminium, and 6 per cent. copper. This proportion of cobalt also improved the qualities of an alloy containing 22 per cent. nickel, 11 per cent. aluminium and 6 per cent. copper. The maximum value for residual induction occurred with a cobalt content of 6 per cent. The magnetic properties are influenced by the rate of cooling and the annealing temperature. (B. Livschitz and L. Kontorovitsch, *Steel* (U.S.S.R.), *9*, 8, 26-30.)

Copper-Smelting in U.S.S.R.

Development of Central Urals Pyrites

THE Central Urals copper-smelting works, the largest of the kind in the U.S.S.R., in the heart of the Urals mining district at Revda, 25 miles from Sverdlovsk, has recently been put into operation. The plant occupies a place in the Soviet non-ferrous metal industry comparable to that of the Magnitogorsk works in the iron and steel industry. Copper ore will be supplied to the new plant by the Degtyarsk pyrites deposits, which contain almost half the copper ore in the Urals. The plant uses coal-dust for firing the reverberatory furnaces, which is considerably cheaper than using oil.

A reverberatory furnace in the plant, 105 ft. long and 26¼ ft. wide, is one of the most improved type in the Soviet Union, and is the work of Soviet builders who took advantage of American and Soviet experience in this field. The charge of pyritic ore and slagging minerals is brought to the furnace by transporters and elevators, and the proportions are weighed and mixed automatically. Manual labour has been reduced to the point where the workers have only to handle the control and measuring devices and the automatic scales. The converters are the first in the Soviet Union to be provided with roller bearings; they also have an original automatic device for emergencies, a "charge rejector," for cases when the blast fails.

Two chimneys, 394 ft. and 492 ft. high, carry away the sulphur-containing gases. These chimneys are situated some distance from the factory and the town, and a special pipeline carries the gases to them. Before the gases are released, they are filtered, and the useful by-products retained.

WHITE TANTALITE

According to a note by Albert E. Williams, formerly Australian Commonwealth Assayer at Darwin, published in *Chemical Engineering and Mining Review* (March, 1940), certain small greyish white pebbles and partially rounded crystals occurring sparingly in the deposits of the Finniss river, Northern Territory, were noted while examining tantalite concentrate from this area. These crystals, prismatic in habit, are somewhat greasy or resinous in lustre with grey streak, and could easily be mistaken for the greyish-white varieties of cassiterite. The specimens obtained differ from the accompanying black varieties of tantalite in that the ferrous oxide percentage is comparatively low, and that oxides of the rare earths are present.

As far back as 1911, the late W. B. Giles, F.I.C., of Leyton, Essex, England, made an analysis of "some nearly white pebbles of tantalite from among a parcel of tantalite from G. Sabine's claim, Finniss river." The specific gravity of these specimens was 6.37. The analysis was stated thus:—

	Per cent.
Loss on ignition	0.24
Tantalic acid	48.44
Niobic acid	33.10
Iron protoxide	1.26
Manganese protoxide	16.12
Cerium and zirconium oxides	0.82
CaO	trace
MgO	"
SnO_2	"
	99.98

PRICE OF WOLFRAM

The current controlled price of wolfram of 50s. per unit f.o.b. from Empire sources is likely to be increased when the present agreement comes up for renewal in the autumn. It is believed in some quarters that a price of from 55s. to 60s. may be agreed upon to compensate Empire producers for increased mining costs.

Corrosion of Aircraft Metals

Increased Resistance with Addition Elements

AMONG the notes communicated by the Director of the U.S. National Bureau of Standards to the *Journal of the Franklin Institute* (1940, No. 1376, 243-4) is a note on the investigations of the corrosion of aircraft metals which have been in progress continuously at the Bureau since 1925. Some 25,000 specimens of aluminium alloys, magnesium alloys, and stainless steels (60 alloys in all) have been corroded by means of accelerated laboratory tests or by exposure to the weather or to sea water. Corrosion was determined by means of loss in tensile properties, or was measured directly on cross-sections examined with the microscope at high magnification.

Corrosion in aluminium alloys occurred as both the "pitting" or intercrystalline types. Willard Mutchler has shown that intercrystalline corrosion has been responsible for serious embrittlement in duralumin-type alloys. Methods of heat treatment were evolved to eliminate intercrystalline attack. The work indicated that pitting could be minimised by preparing alloys from high-purity components, and by keeping the copper and iron contents low. Binary magnesium-aluminium alloys were found to become more susceptible to corrosion as the aluminium content increased. Small additions of zinc or tin rendered these alloys more resistant to attack. Stainless chrome-nickel steels of the 18 : 8 type, containing small additions of molybdenum were more corrosion-resistant than similar alloys without addition elements, or those with small additions of titanium or columbium.

Suitable surface coatings were developed for both aluminium and magnesium alloys, which markedly improved their resistance to corrosion under severe saline conditions. The effect on corrosion produced by joining by means of rivets or by gas-welds, seam-welds, and spot-welds was determined. Important data were also obtained on the potential effects involved when alloys of different chemical compositions were exposed in contact with each other.

U.S. Mercury Output

Large Rise in Exports

UNITED STATES output of mercury amounted to approximately 3100 flasks in May, 15 per cent. higher than in April and about double the monthly rate of the last four months of 1939, according to the Bureau of Mines, U.S. Department of the Interior. Domestic consumption, meanwhile, was estimated to have been 2100 flasks compared with 1900 in April and an average of 2500 for September to December, 1939. The immediate advantages of this situation have, however, been more than offset by the rise in exports. In May 2277 flasks of mercury were shipped from the United States, compared with 316 in April, 1226 flasks in March and an average of 203 flasks for the last four months of 1939. Imports for consumption were only 3 lbs. in May, one flask in April and an average of 819 flasks for September to December, 1939. Early in May the price at New York was $171 to $172 a flask and by the end of the month it had risen to $193 to $195. Further advances were recorded early in June. At the May rate of use, stocks in consumers' and dealers' hands were equivalent to five months' requirements, but were sufficient for only a little more than four months at the average rate for September to December. Domestic production during the month of May was approximately 3100 flasks, compared with 2700 flasks in April and with 1500 flasks each in September and October, 1939. The total for May is predicted on reports received from 45 mines, 39 of which accounted for 94 per cent. of the total output in 1939 and six mines that did not produce in that year. The country's increase in May over April was largely due to greater production in Nevada. In addition to wide industrial use the metal is employed in connection with explosives and for fuses and detonating devices.

Minerals of North Borneo

Chromium, Platinum and Copper

IN an investigation into the mineral wealth of the State of North Borneo, it is reported (*Bull. Imp. Inst.*, 1940, 38, 2, 236-7) that black sands containing chromite were found to occur on the beaches of the eastern and western peninsulas of Marudu Bay and the neighbouring islands off the extreme north-eastern part of Borneo. One of these was found to assay 47.5 per cent. of chromic oxide in addition to being auriferous and argentiferous. Furthermore, massive chromite, in the form of boulders, has been discovered disseminated over a considerable area near Paranchangan on the upper Sugut River. The average chromic oxide content of this chromite is 53.60 per cent. In the black sands of Banguey Island platinum occurs in the not inconsiderable tenor of six grains per cubic yard, but no information is available as to the yardage present.

Copper has also been located in a number of places but the capital to work the deposits has so far been lacking. One cupriferous lode of iron pyrites assayed over 5 per cent. copper, and in association with this, on a tributary of the Kinabatangan River, were other smaller lodes of massive pyrites, assaying in some places up to 17 per cent. copper.

Measuring Chromium Coatings

Spot Test for Thickness

CHROMIUM coatings over nickel deposits on such articles as automobile parts and plumbing fixtures are too thin to be measured by customary methods. The spot test is usually used, in which a measurement is made of the time required for one drop of concentrated hydrochloric acid to dissolve the coating. This method, with temperature corrections, is now prescribed in tentative specifications adopted by the American Electroplaters' Society and the American Society for Testing Materials. W. Blum and W. A. Olson, in a paper prepared for the *Proceedings of the American Electroplaters' Society*, show that it is necessary to control closely not only the temperature but also the concentration of the hydrochloric acid. The use of 11.2 *N* HCl, having a specific gravity at 60°/60° F. of 1.180 is recommended, and a temperature-correction curve for that strength of acid has been plotted. With these precautions, the results are accurate to about 10 per cent.

SPECTROSCOPIC ANALYSIS

Messrs. Wild-Barfield Electric Furnaces, Ltd., announce that they have been appointed by the manufacturers of the Spekker Steeloscope, Messrs. Adam Hilger, Ltd., to be distributors of this instrument in the United Kingdom. This small but remarkably discerning instrument, in its simplest form, can be used for the immediate check and sorting of incoming steels from suppliers, or for identification of steels in stores, which, even in the most carefully organised systems, sometimes get mixed. With the Insta eyepiece, at slight extra cost, it is a valuable addition to any metallurgical laboratory for accurate quantitative analysis. Messrs. Wild-Barfield will be happy to give practical demonstrations to any interested readers, a complete equipment being installed in their research department at Watford.

IRON AND STEEL FROM INDIA

The Government of India has informed the British Government that India can meet the present steel demands from the Middle East, Iraq, Kenya, and Uganda, and that after that a monthly balance of 10,000 tons of untested light steel products and the same quantity of scrap will be available for Great Britain for the next 12 months. Arrangements have also been completed for supplying 300,000 tons of pig iron and foundry iron at the rate of 50,000 tons a month.

General News——From Week to Week

MEN WELL KNOWN IN THE WORLD OF SCIENCE and research attended a memorial service for Sir Oliver Lodge, at St. Margarets, Westminster, on Tuesday.

EMPLOYEES AT THE EVERITE WORKS of Turners' Asbestos Cement Co., Widnes, have just started their second War Savings cycle, with a substantial increase in the number of certificates being purchased.

E. G. ACHESON, LTD., manufacturers of "dag" colloidal products, have moved from Thames House, Millbank, London, S.W.1, to temporary premises at 9 Gayfere Street, Westminster, London, S.W.1. (Tel. ABBey 3366/7/8).

THE COLLEGE OF THE PHARMACEUTICAL SOCIETY, which was transferred to Cardiff soon after the outbreak of the war and has since been accommodated by the University College of South Wales, has now decided to return to London. The new session will be opened at the beginning of October in the Society's premises in Bloomsbury Square.

RECENT SPECIFICATIONS ISSUED by the Ministry of Aircraft Production include: D.T.D. 279, Consolidated Edition for Pigmented Lanolin-Resin Solution; D.T.D. 387, Copper or Copper Alloy Tubes for Honeycomb-Type Radiators; and D.T.D. 406a (superseding 406), De-icing Fluid. Price of each 6d. (post free 7d.), from H.M.S.O. or booksellers

THE ANNUAL REPORT of the Glasgow Corporation Gas Department for the year ended May 31, 1940, states that there was a marked increase in activity at the department's four chemical works, as a result of the increased Continental demand for coal tar products following the cessation of German exports. Recent developments, however, have clouded the prospects for export business this year.

THE PROSPECTUS OF THE MANCHESTER COLLEGE OF TECHNOLOGY for the session 1940-41 has just been issued. The session opens on September 26 and will end on July 25, 1941. Students are enrolled on the three days previous to the opening date, from 10 a.m. to noon, and from 2 to 4 p.m. Undergraduate (3-year) courses in applied chemistry are divided under eight heads, in textile chemistry under two heads, and there is a special graduate one-year course in chemical engineering.

WITH THE APPROACH of longer hours of darkness, the question of factory black-out becomes increasingly urgent. Factory managers who are again faced with the question of obscuration of lighting are therefore reminded that a pamphlet called "War-time Lighting Restrictions for Industrial and Commercial Premises" can be obtained from the Stationery Office or through any bookseller, which gives complete information on the subject. The price of the pamphlet is 2d. (3d. post free). This pamphlet, issued shortly before the war, is still completely up-to-date.

OVER A THOUSAND CHEMICAL WORKERS in Aberdeen and East Scotland will obtain an increase of 3s. per week in wages as the result of an agreement concluded between the National Union of General and Municipal Workers and the representatives of the firms concerned. The increases, which are retrospective from the first pay day in August, bring the war-time advances up to 10s. per week. The firms concerned in the agreement are: Scottish Agricultural Industries, Ltd., Aberdeen and Leith; J. Miller and Co. (Aberdeen), Ltd.; Dyce Chemical Works; Aberdeen Lime Co.; Scottish Mutual Fish Products, Ltd., Aberdeen; Caledonian Milling Co., Aberdeen; and Tennants' Chemical Works, Carnoustie. The union has fixed up a holidays-with-pay agreement for the employees of Scottish Mutual Fish Products and Tennants' Chemical Works, thus bringing them into line with the other firms in the industry.

Foreign News

APATITE DEPOSITS IN FRENCH INDO-CHINA are now being developed, states *World Trade Notes*. The presence of the deposits, which are estimated to contain several million tons of ore, has been known for some time.

PLANT FOR THE MANUFACTURE OF LITHOPONE, of which about 3000 tons a year are used in Australia, chiefly as a basis for the manufacture of paint, is to be installed at Port Pirie by the Electrolytic Zinc Co. of Australasia, Ltd. Hitherto, all the lithopone used in Australia has had to be imported and since the war began the price has risen from £23 to £40 a ton.

CANADA'S GYPSUM PRODUCTION IN MAY, as reported by the Dominion Bureau of Statistics, totalled 130,278 tons, against 51,049 tons in April and 116,696 tons in April, 1939. Production for the first five months of the year amounted to 340,215 tons, against 221,094 tons in the same period of 1939.

THE LARGE DANISH SUPERPHOSPHATE and sulphuric acid industry, comprising four large factories, reported in the middle of June, according to *World Trade Notes*, that they would soon have to close their plants because their stocks are almost exhausted and it does not appear possible to obtain new supplies.

THE CHINESE TUNG TREE (*Aleurites Fordii*) is now being cultivated in Japan on an extensive scale, the chief plantations being in Wakayama Prefecture. The oil extracted from trees which have recently come to maturity has been analysed and found to possess constants very close to those of the original Chinese tung oil (*J. Soc. Chem. Ind.*, Japan, May 1940).

THE PRODUCTION IN THE U.S.A. of 605,757,000 lb. of coal-tar intermediates in 1939 was 50 per cent. greater than the output in 1938 and established a new record. Sales, by quantity, were up 56 per cent. The increase under the head of intermediates used in the manufacture of synthetic resins was the largest in proportion, the output of phthalic anhydride and phenol rising 60 per cent. and 54 per cent. respectively.

AMONG RECENT GERMAN PATENTS is one for stencil inks. Aluminium hydroxide is included in a usual type of composition for the purpose of preventing changes in consistency with fluctuating temperatures. Examples: 120 parts aluminium hydroxide, 500 mineral oil, 30 lampblack and 30 milori blue; or 80 aluminium hydroxide, 50 violet lake, 350 glycerine, 30 water and 30 gum arabic. (G.P. 686,679, Greif-Werke).

ANOTHER RECENT GERMAN PATENT is for synthetic floor and wall coverings. Esters or other derivatives of crotylidene cyanoacetic acid are polymerised after incorporation of a suitable filler, e.g., asbestos fibre, cork powder, wood flour, etc. Sufficient water is present to yield a brushable mass after polymerisation, which proceeds in presence of an organic or inorganic base. (G.P. (Austrian branch) 157,732, I.G.).

REPORTS FROM ATHENS indicate that attempts are likely to be made by the Axis Powers to divert the production of Greek chrome ore to German factories. It is stated locally that at the beginning of the war Britain bought the entire output, amounting to some 60,000 tons per annum, and stored most of it in Greece. It is now thought that pressure may be exercised, through Italy, to induce the Greeks to transfer this stock to German munition works.

PRINTING ROLLERS of outstanding durability are made from starch and a glycerine-magnesium chloride syrup in proportions of 25 parts starch to 25-35 parts glycerine syrup. The latter is first prepared from 11 parts glycerine and 1.6 parts magnesium chloride. The mix is filtered, allowed to stand for 24 hours and finally cast into moulds. The hardness of these rollers declines as the syrup content increases. (M.M. Nurkass, Polygraphic Industry (U.S.S.R.), 1939, No. 6, 44-6.)

THE FIRST NUMBER OF Vol. 11 of the Thai Science Bulletin, published by the Department of Science, Ministry of Economic Affairs, Bangkok, contains a comparative study of edible and poisonous beans of the lima type. The author, Arno Viehoever, points out that whereas the large-seeded type is edible, the small-seeded type has been found to yield up to 0.3 per cent. of hydrocyanic acid. Lima beans were imported to Europe and America for food in the closing stages of the last war, so that the recognition of the poisonous types may once again be of high importance.

ACCORDING TO A REPORT IN *Mineral Trade Notes*, the production of vanadium pentoxide from naphtha soot collected at Italian ports and industrial plants in Italy has been successful, annual output having reached 50,000 kg. of vanadium-bearing concentrates. The plant, which is at Genoa, has been taken over by the Azienda Minerali e Metalli Italiana. A supply of naphtha soot sufficient to justify the operation of the plant appears to be assured, as virtually all Italian naphtha-burning ships and industrial plants in various sections of the country are collecting the soot from smokestacks for shipment to the plant.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

OXTED GREYSTONE LIME CO., LTD., London, S.W. (M., 7/9/40.) Aug. 22, £3,500 (not ex.) charge, to Lloyds Bank, Ltd.: charged on land, factory, cots, and chalk pits at Oxted. *Nil. May 9, 1940.

County Court Judgments

CENTRAL IONOLYT, LTD., 30 Maple Street, W.1, chemical producers. (C.C.J., 7/9/40.) £22 17s. 0d. July 3.

HERRIS, GEO., 34 Lyndhurst Road, Wolverhampton, research chemist. (C.C.J., 7/9/40.) £20 5s. 10d. July 19.

Companies Winding-Up Voluntarily

THE BUELL COMBUSTION CO., LTD. (C.W.U.V., 31/8/40). By reason of its liabilities. Robert Hermann Alexander Neuschild, 49 Moorgate, London, E.C.2, appointed liquidator.

Company News

The Yorkshire Dyeing and Proofing Co., Ltd., is paying a dividend of 2½ per cent., less tax, for the year to June 30, 1940. This is the first dividend since 1936-37, when the payment was 8 per cent.

The Leeds Fireclay Co., Ltd., announce a preference dividend of 4 per cent., less tax, for the year to June 30, 1940 (last year 5 per cent.).

Chemical Trade Inquiries

U.S.A.—A well-established agent at Los Angeles wishes to obtain the representation of United Kingdom exporters of crude drugs, chemicals, spices, vegetable oils, oilseeds and fibres. (Ref. No. 473.)

Argentina.—A firm of agents established at Buenos Aires wishes to obtain the representation of United Kingdom manufacturers of refractory material, packings, machinery for sugar and cement industries, etc.

Argentina.—A firm of agents established at Buenos Aires wishes to obtain the representation of United Kingdom manufacturers and exporters of varnishes, shellac, cellulose paints, motor accessories, polishes, etc.

New Companies Registered

Stair (Engineering), Ltd. (363,070).—Private company. Capital £2000 in 2000 ordinary shares of £1 each. Mechanical, electrical and chemical engineers, etc. Subscribers: Percy R. Pitts, 58 Howberry Road, Canons Park, Edgware, Sidney Silver, Solicitors: Roche, Son and Neale, 1 St. Olave's Court, Old Jewry, E.C.

H. S. Punch, Ltd. (363,019).—Private company. Capital £1000 in 1000 shares of £1 each. Manufacturers of and dealers in chemicals, gases, drugs, medicines, plaster of Paris, gypsum, disinfectants, fertilisers, salts, acids, etc. Directors: Wm. F. Grant, Mrs. Mary J. Swales and John Swales. Registered office: 53 Micklegate, Selby, Yorks.

Birmingham Colour Company, Ltd. (362,920).—Private company. Capital £3000 in 3000 shares of £1 each. Manufacturers of and dealers in paints, colours, varnishes, enamels, distempers, cellulose products and finishing materials. Directors: John P. O. Dutton, Samuel E. George, and William A. George. Solicitors: Faber & Co., 43 Cannon Street, Birmingham. Registered office: 1 Oxford Avenue, Trading Estate, Slough.

Miller Engineering Products, Ltd. (362,752).—Private company. Capital £100 in 99 ordinary and 1 "A" share of £1 each. Chemical, mechanical, electrical, automobile, aeronautical, hydraulic, photographic, marine and civil engineers and metallurgists, etc. Subscribers: A. I. Logette, A. Ingrain. Solicitors: Logette and Bonnett, 34-8 Southampton Street, W.C.2. Registered office: Power Road, Gunnersbury, W.4.

Physico-Chemical Processes, Ltd. (362,846).—Private company. Capital, £100 in 100 shares of £1 each. Research physicists and chemists, mechanical, electrical and chemical engineers, metallurgists, inventors, etc. Subscribers: Leslie J. Solley, B.Sc., Bernard Solley. Leslie J. Solley, B.Sc., is the first director. Solicitor: Louis Sellar, LL.B., 152 Commercial Street, E.1. Registered office: 152 Commercial Street, Bishopsgate, E.1.

B.S.O. (Wigan), Ltd. (362,774).—Private company. Capital, £100 in 2000 shares of 1s. each. Manufacturers, refiners, blenders, importers and exporters of and dealers in oils and oleaginous compounds and emulsions, and any substances from which oil can be extracted or the composition of which contains oil, dealers in substances obtainable in the course of manufacture, extraction or refining of oils, alcohols, ethers, esters, gases, lubricants and petroleum products generally, etc. Subscribers: Richard T. Power, and Arthur Alker. Secretary: M. Henry Bedford. Solicitors: H. L. F. Berry and Co., 40 King Street, Manchester. Registered office: 44 King Street, Manchester.

F.S.C., Ltd. (362,839).—Private company. Capital, £400 in 7000 6 per cent. cumulative preference and 1000 ordinary shares of 1s. each. Manufacturers and exporters of and wholesale and retail dealers in fire-fighting and fire-extinguishing fluids, chemical and other compounds, manufacturers of and dealers in appliances, machinery, and apparatus connected with air raid precautions and protection against poisonous and other noxious gases, including gas decontaminating appliances, etc. Permanent directors: Melvill Sankey, Aldwych House, Aldwych, W.C.2; John G. A. Bickford. Solicitor: Alexander Pollock, 2 Howard Street, Strand, W.C.2.

Chemical and Allied Stocks and Shares

SENTIMENT on the Stock Exchange has continued to be governed more by the absence of selling than by the very small volume of business in all classes of securities. The firmness in British Funds was also an important market factor. In accordance with the general tendency, movements in most shares of chemical and kindred companies were small, but in many instances they were in favour of holders on balance for the week.

Imperial Chemical continued to show moderate fluctuations, awaiting declaration of the interim dividend, but at 25s. 7½d. were a few pence higher on balance. On the other hand, the preference units went back 6d. to 28s. 3d. Borax Consolidated deferred units held their recent improvement; the accounts are made up to the end of this month, but do not fall to be issued until February or March. British Oxygen were firm around 60s. aided by the maintenance of the interim dividend, which is payable on larger capital than a year ago. British Aluminium were easier at 34s. 4½d.; this company's interim dividend decision is imminent. Turner and Newall reacted to 54s. and elsewhere, Associated Cement declined to 48s. 9d. under the influence of the reduction in the interim distribution. Where changed, other cement shares also moved against holders, but British Plaster Board 5s. shares remained around 9s.

There was a fair amount of activity in Triplex Glass 10s. units, awaiting the dividend announcement, and business at the time of writing has been around 18s. United Glass Bottle, although "ex" the interim payment, remained firm at 43s. 9d. on market hopes that it may be possible to keep the total dividend around 12 per cent.; last year a dividend of approximately 19 per cent. was earned, but, as usual, a large sum was added to reserves, etc. Dunlop Rubber became firmer at 28s. 9d., while British Match at 29s. 3d. more than held last week's improvement. Textile shares had a firmer appearance, aided by the improved results of Calico Printers and the payment on account of preference dividend arrears. Courtaulds were steady around 27s. 6d., and slightly better prices ruled for British Celanese first and second preference shares. In the iron and steel section the general tendency was firm, with Stewarts and Lloyds 36s. 3d., Dorman Long 15s. 3d. and Tube Investments 80s. 7½d. In other directions, International Paint were higher at around 65s., while hopes of a satisfactory interim payment from Pinchin Johnson was reflected by further improvement in the shares of this company from 17s. 9d. to 18s. 3d. Barry and Staines continued to hold their recent improvement to 23s. 1½d., but as in other directions, quotations were tested by very little business this week. Wall Paper Manufacturers deferred units were maintained at 16s. 3d.

Lever and Unilever were slightly higher at 19s. 9d., while British Oil and Cake Mills preferred ordinary kept at 31s. 10½d. United Molasses 6s. 8d. units were higher at 20s. at which a satisfactory yield is given on the basis of the dividend for last financial period, which was at the rate of 22½ per cent. per annum. The ordinary units of the Distillers Co. were steady at 56s., and in other directions, Metal Box remained at 62s. 6d. Murex ordinary, however, were easier at 67s. 6d., while International Combustion were unchanged at 80s., and B. Laporte 48s. 9d. William Blythe 3s. shares were quoted at 5s. 6d. Lawes Chemical were again 7s. 6d. awaiting the financial results.

Elsewhere, British Drug Houses were unchanged at 20s., and Boots Drug transferred around 38s. 9d. Beechams Pills deferred shares were slightly higher at 7s. 7½d. on hopes that the interim dividend may be maintained. Monsanto Chemicals 5½ per cent. preference remained at 21s. 3d. and Greeff-Chemicals Holdings 5s. units were again around par. Among oil shares Trinidad Leaseholds were easier, but "Shell" were inclined to improve.

CLASSIFIED SECTION

NOTE: Trade announcements, other than strictly second-hand and job lines, cannot be inserted in these pages except by firms whose advertisements run in the display columns

APPOINTMENTS WANTED

PERSON seeks situation, chemical works, over twelve years' experience Laboratory and Plant. Five years as plant manager. Not graduate. Age 30. Present post seven years, mainly inorganic. National importance preferred. Box No. 1991, THE CHEMICAL AGE, 154 Fleet Street, E.C.4.

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Many of the finest posts in Britain in Wartime are reserved for Chemical Engineers. The same will be the case when the war is over. The vast technique and experience now being applied to Chemical Technology for war purposes will then be suitably utilised in reconstruction, and in trade and commerce.

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219, Temple Bar House, London, E.C.4.

FOR SALE

100 REBUILT Hydro Extractors by all leading makers from 18 in. upwards with countershafts attached and safety covers. Jacketed Steam Pans, various sizes. List on request. Seen at Randalls, Arundel Terrace, Barnes. Telephone : Riverside 2436.

50,000 FEET brand new Balata and Rubber Belting, all popular sizes. Every belt guaranteed and sent on approval at bargain prices. Write for stock and price lists, F. Taylor & Sons (Manchester), Ltd., Barr Hill Works, Salford, 6, Lancs.

'Phone 98 Staines.

35 GALLON Copper Jacketed Mixing Pan : 26 Chamber Filter Press, 24 in. square : 25 gallon Brass Lined Paste Mixer : 250 Kilo Liquid Scales : 40 ft. of 11 in. Worm Conveyor.

HARRY H. GARDAM AND CO., LTD., STAINES.

CHARCOAL, ANIMAL, and VEGETABLE, horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—THOS. HILL-JONES, LTD., "Invicta" Mills, Bow Common Lane, London, E. Telegrams, "Hill-Jones, Bochurch, London." Telephone : 3285 East.

DRYING PLANT, consisting of Vertical Steam Boiler, Steam Jacketed Horizontal Dryer, U-shaped with Stirring Gear, small size Disintegrator and A.C. Motors to drive same. RANDALLS, Engineers, Barnes.

FOR Sale :—1 Stone Tank, 5 ft. 6 in. square by 6 ft. 3 in. deep, the stone forming the base is one foot thick and the sides 8 in. thick, the stones are joined by means of mitre joints with rubber packings.

3 Stone Tanks each 10 ft. long by 5 ft. wide and 4 ft. deep, the average thickness of the stones is 6 in., and the joints are made by recessing the stones into each other.

The tanks are in very good condition and practically unused. INGHAM'S THORNHILL COLLIERIES, LTD., Dewsbury.

600

WELDED Steel High Pressure Mixer, by Widnes, 5 ft. 0 in. dia. by 2 ft. 6 in. deep, vertical agitator driven through machine cut wheel and pinion from fast and loose pulleys.

Horizontal Cylindrical Mixer, by Brinjes and Goodwin, 24 in. long by 2 ft. 6 in. dia., arranged with feed opening 1 ft. 10 in. by 1 ft. 4 in., agitator driven from fast and loose pulleys.

Horizontal Cast Iron Recessed Plate Filter Press, by S. H. Johnson, 24 ribbed surface plates, each having filtering area 2 ft. 0 in. square, forming cakes 1¼ in. thick.

Duplex Condenser, 8 ft. 0 in. long by 4 ft. 1 in. wide by 6 ft. 1 in. deep overall, the shell is of riveted construction, built up of mild steel plate.

Copper Steam Jacketed Tilting Pan, 22 in. diameter.

Johnson Filter Press, 30 plates, 24 in. dia. centre feed, side outlet.

Double Action Tilting Pan, by Brierley, Collier and Hartley, 80-galls. capacity, fitted with rise and fall motion. TWO AVAILABLE.

Jacketed Mixer with tinned pan, 24 in. dia. by 19½ in. deep, mixing blades overdriven through crown wheel and pinion from fast and loose pulleys. FOUR AVAILABLE.

GEORGE COHEN
Sons and Co., Ltd.
STANNINGLEY, LEEDS.

COMBINED AUTOMATIC WEIGHING, MEASURING and Mixing Plant, with six weighers, capacity about one ton per hour, with 20 h.p. and 7½ h.p. motors, elevator, conveyor, vibro-screen, etc. Can be seen erected in Kent. THOMPSON AND SON (MILLWALL), LTD., Cuba Street, Millwall, London, E.14. East 1844.

1000 STRONG NEW WATERPROOF APRONS. To-day's value 5s. each. Clearing at 30s. dozen. Also Large Quantity Filter Cloths, cheap. WILSONS, Springfield Mills, Preston, Lancs. Phone 2198.

26 UNDER-DRIVEN Copper-Cage HYDRO : Several "Z" Werner Mixers. Gardner Sifter Mixers, Rapid Dryer and Centrifugal Dressing Machines. Please enquire, Winkworth for Machinery, 65 High Street, Staines. Telephone—1010.